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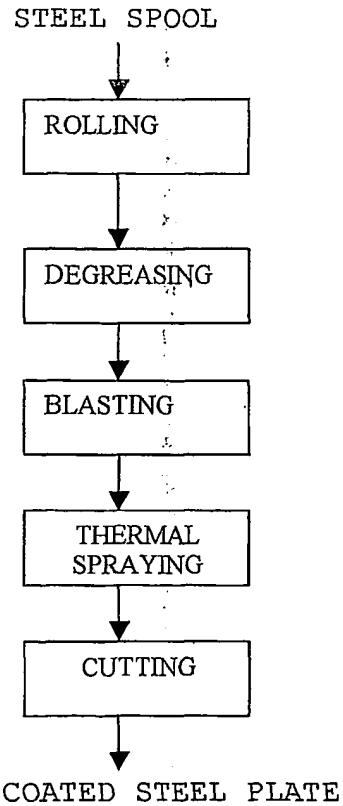
(54) Title: USE OF THERMAL SPRAYING WITH NIOBIUM OXIDES AND NIOBIUM ALLOYS DURING THE PRODUCTION PROCESS OF ROLLED STEEL PLATES



(57) Abstract: This innovation describes the utilization of the Thermal Spraying with Niobium oxides and alloys in the manufacturing of rolled steel plates, to be applied in the production of thermal exchange equipment, or those that are exposed to atmospheres with corrosive gases in high temperature, as for example, H_2S and CO_2, as well as fumes from solvents and acids.

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— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Description of the Patent of Invention for "Use of Thermal Spraying with Niobium Oxides and Niobium Alloys During the Production Process of Rolled Steel Plates".

TECHNICAL FIELD

This innovation refers to the use of niobium oxides and niobium alloys applied by the Thermal Spraying technique during the production of rolled steel plates manufactured by the pre-coated conventional process, on the train of rolls. As a result, flat, conformed or profiled steel plates could be industrially produced in large scale, already protected against highly corrosive environments, mainly in those presenting high temperatures, showing presence of gases such as H_2S, SO_2, CO_2 as well as fumes or acids.

BACKGROUND OF THE INVENTION

In the utilization of rolled plates in corrosive environments, it is common the use of Enamel as a anticorrosive coating. Notwithstanding, several problems take place during the assemblage of equipment as for example, heat exchangers and heat recuperators among others, since the Enamel does not have sufficient mechanical resistance to the rolling and eventual curving that the steel plates might have to endure.

Consequently, the coating looses adherence and exposes the steel to the corrosive environment, reducing the useful life of the rolled steel plates.

SUMMARY OF THE INVENTION

In its most general aspect, this invention proposes the use of Thermal Spraying with niobium oxides, niobium alloys and associations thereof with other metals, alloys or oxides as an anticorrosive coating, in the industrial production of plain or coated rolled plates, according to the application for the Brazilian Patent PI 0203534-0.

DETAILED DESCRIPTION OF THE INVENTION

The Brazilian Patent PI N.0203534-0 for this invention refers more particularly to the utilization of Thermal Spraying with niobium oxides and niobium alloys such as Al-Nb,Ni-Nb, among others, preferably the niobium oxides, during the manufacturing of plain or coated rolled steel plates. The steel plates production process and the niobium application obey traditional processes as the described below:

1- Degreasing of the plate right out from the rolling;

2- Blasting of the superior and inferior plate surfaces at SA 2½ degree;

3- Thermal Spraying by oxi-acetylene torch on both superior and inferior surfaces of the steel plate with niobium-based oxides and alloys;

4- Separation of the plates, by cutting, in the desirable dimensions on the rolling train;

5- Storage of the coated rolled steel plates;

6- Eventual shaping of the plates, by bending, profiling or any other specific demand from the consumer;

Figure 1 represents, in block diagram, a conventional manufacturing process for rolled steel plates.

Among the advantages of the Thermal Spraying application in the production line of rolled steel plates are the improvement of the adherence providing plate conformations for bending, profiling or any other shaping without the exposition of the substrate to the corrosive environment, as well as the improvement of the superficial state, preparing it to receive the finishing coat of paint.

CLAIMS

1-."Use of Thermal Spraying with Niobium oxides and Niobium alloys During the Production Process of Rolled Steel Plates." Characterized by applying Niobium, its oxides and alloys such as Ni-Nb,Al-Nb, among others, in the production of coated steel plates.

FIGURE

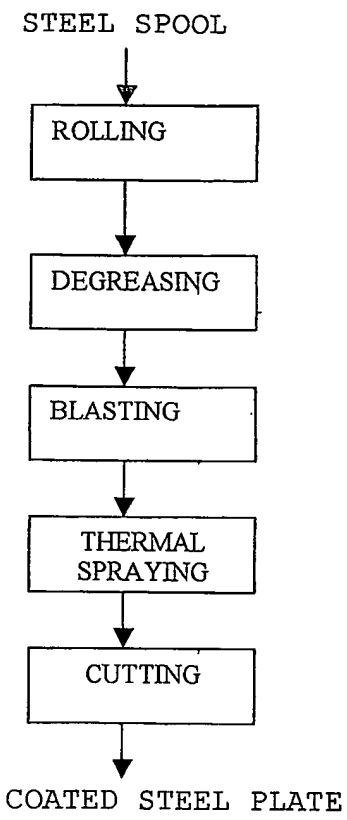

Figure 1

INTERNATIONAL SEARCH REPORT

International application No.
PCT/BR 03/00117-0

CLASSIFICATION OF SUBJECT MATTER

IPC[7]: C23C 14/06, 16/40

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC[7]: C23C, C22C, B23B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, EPODOC, STN-Patdpa, Depatisnet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1054075 A1 (RENAULT) 22 November 2000 (22.11.00) *claims.*	1
A	US 5111567 A (LEINO et al.) 12 May 1992 (12.05.92) *claims.*	1
A	US 6238807 B1 (YASUDA et al.) 29 May 2001 (29.05.01) *claims.*	1
A	US 4609401 A (SIMM et al.) 2 September 1986 (02.09.86) *claims.*	1

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
„A" document defining the general state of the art which is not considered to be of particular relevance
„E" earlier application or patent but published on or after the international filing date
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„Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
„&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
10 December 2003 (10.12.2003)	19 February 2004 (19.02.2004)
Name and mailing adress of the ISA/AT Austrian Patent Office Dresdner Straße 87, A-1200 Vienna Facsimile No. 1/53424/535	Authorized officer STEPANOVSKY M. Telephone No. 1/53424/

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/BR 03/00117-0

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